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descriptions, from which the progressive and sudden shiftings of the lines and the relative times of their occurrence can easily be seen.

G. F. PADDOCK.

January, 1919.

HISTORICAL LETTER RELATING TO THE 36-INCH TELESCOPE

Mr. Ambrose Swasey has courteously given us permission to publish the following letter which we believe will be of interest to all members of our Society.—PUBL. COM.

July 31, 1896.

MR. J. F. HOLLOWAY,
Buffalo, New York.

DEAR FRIEND HOLLOWAY: Thinking it may be of interest to my friends I will relate some of the incidents that occurred during the time I was engaged in the erection of the Lick Telescope.

In the fall of 1887, the instrument was shipped to San Jose, California, and conveyed by team to the observatory on Mount Hamilton, which is about 4500 feet high[1] and thirteen miles distant in direct line and twenty-seven miles by road. The people of San Jose took great interest in everything that pertained to the Lick Observatory, and were especially interested in the powerful instrument that was to be placed in the great dome, which could be clearly seen from any part of the city. Every one having anything to do with the observatory or its instruments received special attention, and I was often smilingly met by "Good-morning, Professor Swasey"—thinking of course that was the proper title to give one engaged in the construction of astronomical instruments.

The great sections of the telescope, weighing several tons, were loaded on trucks drawn by six or eight unfortunate beasts, sometimes called horses. There were usually two drivers—the duty of one being to hold the lines and ride, while the other walked along by the side of the animals, and pelted them with stones, when extra energy was needed to revive their spirits in climbing the many long and steep grades. When they arrived at the top of the mountain, one could easily imagine the poor creatures—nearly dead from exhaustion—saying to one another: "This may be all right for science, but it is mighty hard on horseflesh."

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[1] Later, the elevation of the marble floor of the observatory above mean-tide level was determined to be 4,209 feet.—PUBL. COM.

We had a great many kinds of weather on the mountain; the wind often blew from sixty to seventy-five miles per hour, and on one occasion it reached eighty, and no one knew how much higher for at that speed the anemometer blew off and landed in the valley a long distance away. It was not possible to walk from one building to another without holding on to something for fear of being blown off the mountain into the canyon nearly a thousand feet below. On another occasion we had such a severe snow storm that all communication was cut off from San Jose for several days, and as it was impossible to get at the fire wood on the side of the mountain on account of the snow, we were obliged to burn the boxes in which the great telescope was packed in order to keep warm.

After the telescope was in working order and the object glass placed in position, on the evening of January 3, 1888, Capt. Floyd, president of the Lick trustees, Professor Keeler, the astronomer in charge, Mr. Alvan Clark and myself went to the observatory to observe the stars for the first time through the great instrument. Mr. Clark pointed the instrument on one of the prominent stars, and commenced to adjust the focus. After working for some time, moving the eye-piece out and in to the fullest extent of its adjustment, he could not bring the star into focus. We all stood there in perfect silence waiting for the first observation, but seeing that Mr. Clark could not possibly adjust the focus, I broke the spell by saying: "Well, it is quite evident that the tube is too long or the focus is too short." It was then nearly midnight, and we left the instrument and went to our rooms. Quite early in the morning, however, I went to the observatory and there found Mr. Clark as anxious as I to find out the cause of the difficulty. After measuring the focal length of the instrument, which was quite a difficult task with the means at our disposal, we found that it was 56 feet instead of 56 feet 6 inches, the length given us. Mr. Clark at once said, "We have made a mistake and have given you the focus six inches too long." I then directed our men to cut off six inches from the objective end of the great tube, and on the evening of January 7, the cell and all the accessories were back in their positions and the first successful observations were made. I remember they accorded me the honor of being the first to observe the Planet Saturn through the great instrument, and I still have the beautiful drawing of the planet, as it appeared that evening, which Professor Keeler made for me.

Professor Holden, who had been appointed director of the observatory, was then president of the University of California. On my invitation he visited the observatory in order to inspect the instrument before I left for the East, and I shall never forget the look of wonder and surprise as he entered the dome and saw before him for the first time the great instrument. The mechanism of the finder not having been adjusted, I stepped upon the tube of the telescope to remove the finder cap. Professor Holden sang out to me—"Is that what you do, walk on a telescope that way?" "Yes," I said, "I have seen a dozen men on this tube at one time." He did not realize that the great instrument before him, of which he was about to take charge, had not only an objective which was the most powerful light gatherer ever made, but that from an engineering standpoint it was the most powerful instrument ever constructed.

Very respectfully,
(signed) AMBROSE SWASEY.

THE FOCAL LENGTH OF THE 36-INCH REFRACTOR

In Dr. Swasey's interesting note, which precedes, the focal length of the 36-inch Lick refractor is given as approximately 56 feet. Evidently this value, which is stated in the first published description of the instrument[1] as 674 inches (56 feet 2 inches), refers to the length of the large tube of the telescope, since the focal length of the 36-inch lens for the visual rays, determined in the usual way from micrometric measures, is 694 inches[2] (57 feet 10 inches). It seems worth while to call attention to these facts as the erroneous value has been quoted in various places, especially in Young's *General Astronomy.*

J. H. MOORE.

NOTE ON COMET *d* 1918 (SCHORR)

The fourth comet of 1918 was discovered by R. Schorr, director of the observatory at Bergedorf, near Hamburg. It was found on November 23rd, but the cabled announcement, thru Copenhagen, did not reach American astronomers till the 29th.

On the evening of the 29th, an observation was secured by Burton at the Naval Observatory, Washington. On the next

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[1] *Publ. Lick Obs.*, **1**, 61, 1887.

[2] *Ibid.*, **3**, 1, 1894.